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TITLE: Information processing apparatus, information processing system, print control method, and storage medium storing computer readable program

Abstract Text (1):

The object is to print continuously in the specified order by one operation a series of print jobs printed in any timing by a plurality of host computers for the same printer even if a usual print job is spooled together in a print server. In a method for solving the problem, a print server identifies ordered print jobs for which print order is to be specified and non-ordered print jobs out of a plurality of print jobs transmitted in any timing from a client, the print order for each print job identified as such is rearranged and aligned in specified order, and the output order for each print job aligned for a printer based on the state of alignment.

Brief Summary Text (6):

Furthermore, print systems in recent years are configured such that the job name of a print job and the like spooled in a server can be displayed on a client, and there exist systems that make it possible to specify a print job and perform suspension and termination and even order control of the printing of specified print jobs depending on the authorization of the client by using network utility software installed in the client.

Brief Summary Text (7):

Furthermore, as software operating on clients in recent years, there exist systems that enables batch print, by holding print jobs of PDL format generated by a printer driver without requesting a print server to print them, and transmitting by one operation a plurality of print jobs as a print request to a print server.

Brief Summary Text (14):

Furthermore, for the single print job, it is taken into account to change the printing matter in print systems in recent years, but it is not taken into account to change the printing matter for the grouping job as described above. Therefore, for the single print job, the ejection side is not a matter of concern so long as PDL is the same even when the printing matter is changed. That is because the print job is internally spooled and printing in invert page order is achieved due to the function of the printer itself. However, it is achieved due to the function of the printer itself only for the single job, and it not yet achieved for the grouping job considered in the present invention.

Detailed Description Text (5):

Reference numeral 101 is an information processor as a server (called a print server, hereinafter) and connected to the network 106 by the network cable to accumulate files employed in the network or to monitor the using status of the network 106. The print server 101 manages a plurality of printers connected to the network 106. In the configuration, the clients 102 to 104 and the print server 101 serve as general information processors. In the clients and the print server, print

control programs for performing respectively different controls are stored so as to be executable.

Detailed Description Text (6):

The print server 101 in the first embodiment of the invention further includes functions for storing and printing print jobs having the print data for which print requests are issued from the client computers 102, 103 and 104, or receiving only job information including no print data from the client computers 102, 103 and 104, managing the print order of the client computers 102, 103 and 104, or informing the clients arranged in accordance with the print order of the transmit permission of the print jobs including the print data, obtaining a variety of kinds of information of the status or the print jobs of a network printer 105 or informing the client computers 102, 103 and 104 of them.

Detailed Description Text (7):

Reference numeral 105 denotes the network printer as a print controller which is connected to the network 106 through a network interface not shown. The network printer 105 analyzes the print job including the print data transmitted from the each client computer and converts it into a dot image one page by one page and prints each page. Reference numeral 106 denotes the network connected to the client computers 102, 103, 104, the server 101, the network server 105 or the like.

Detailed Description Text (10):

In FIG. 2, reference numeral 200 denotes a CPU as the control means of the information processors and controls to execute application programs stored in a hard disk (HD) 205, printer driver programs, OS and the control programs of the network printer control program of the present invention and to temporarily store in a RAM 202 information, files, etc. required for executing the programs.

Detailed Description Text (13):

Reference numeral 204 denotes the floppy disk (FD) as the storing medium in which programs readable by a computer are stored. In this FD 204, the network printer control program described in the present embodiment and related data are stored. The configuration of contents stored in the FD 204 will be described below by referring to FIG. 4.

Detailed Description Text (14):

Reference numeral 205 denotes the hard disk (HD) which is one of external storing means and functions as a large capacity storage memory in which the application program, the printer driver program, the OS, the network printer program, the associated program, etc. are stored. Further, a spooler as spooling means is maintained therein. The spooling means designates a client spooler in the clients, and a server spooler in the print server. Further, in the print server, a table for storing the job information received from the clients and controlling the order is also formed and stored in the external storing means.

Detailed Description Text (16):

Reference numeral 207 denotes a display as display means adapted to display the commands inputted from the keyboard 206, and the state of the printer, etc.

Detailed Description Text (19):

FIG. 3 is a diagram showing an example of a memory map of the RAM 202 shown in FIG. 2. The memory map shows a state in which the RAM 202 is loaded with the network printer control program unloaded from the FD 204 so that the program can be executed.

Detailed Description Text (20):

According to the present embodiment, although an example in which the RAM 202 is loaded with the network printer control program and the associated data from the FD 204 so as to execute the program and data, the RAM 202 may be loaded with the

network printer control program from the HD 205 in which the network printer program is already installed every time the network printer control program is operated from the FD 204, with the exception of the above example.

Detailed Description Text (21):

As media for storing the network printer control program, there may be exemplified the CD-ROM, the CD-R, the PC card, the DVD, the IC memory card except the FD. Further, the network printer control program may be stored in the ROM 21. Then, the network printer control program is configured to form a part of the memory map so that it can be directly executed by the CPU 200.

Detailed Description Text (22):

Further, the network printer control program may be simply called a print control program. In the clients, the print control program includes programs for performing controls of designating grouping jobs as print jobs which are designated to be grouped and instructing a printer to be changed. In the print server, the print control program includes programs for controlling the order of the grouping jobs, managing the spools of all the print jobs in the grouping jobs and noticing the end of print of the grouping jobs or a request for change of a printer, etc. The print control program of the present invention for carrying out the above mentioned controls may be separately divided into a module installed in the clients and a module installed in the print server. An execution part may be selected so that the print control program is installed by installing it once and it functions for the clients or for the print server depending on an environment where the print control program is executed. The print control program according to the present embodiment includes both the functions.

Detailed Description Text (24):

Reference numeral 302 denotes an operating system (OS). 303 designates the network printer control program and stored in an area ensured on the RAM 202. 304 denotes the associated data and stored in an area ensured on the RAM 202. 305 denotes a work area and an area for executing the printer control program by the CPU 200 is ensured therefor.

Detailed Description Text (26):

In FIG. 4, reference numeral 400 denotes the contents of the data of the FD 204. 401 denotes volume information showing the information of the data. 402 denotes directory information. 403 designates the network printer control program as the print control program which is described in the present embodiment. 404 denotes the associated data thereof. The network printer control program 403 is programmed on the basis of a flowchart described in the present embodiment. According to the present embodiment, the configuration of the client is the same as that of the server.

Detailed Description Text (29):

In the FD 204, the network printer control program described in the present embodiment and the related data are stored.

Detailed Description Text (31):

Referring to FIG. 6, reference numeral 600 denotes a client machine in which a client module corresponding to the network printer control program as the print control program for executing a procedure shown in a flowchart described below.

Detailed Description Text (32):

In the same figure, reference numeral 601 denotes an application software for creating documents or tables and outputs graphic drawing data to a graphic engine 602 upon displaying or printing. The graphic engine 602 is graphic drawing means provided by the OS, which indicates a GDI in the OS of Windows (registered trademark of Microsoft Corporation, in U.S.A.). The graphic engine 602 converts a GDI (Graphic Device Interface) function as the graphic drawing data outputted from

the application 601 into a DDI (Device Driver Interface) function as graphic drawing data which can be interpreted by a printer driver 603 and outputs the DDI function to the printer driver 603 upon printing process. The printer driver 603 converts the DDI function into the print data including a PDL (Page Description Language) which can be interpreted by the printer on the basis of the DDI function received from the graphic engine 602 and outputs the print data as the print job with a JL (Job Language) added to a Windows Spooler 604 as a spooler provided by the OS. Further, the application 601 shifts its processing to the printer driver 603 upon set-up of printing. The printer driver 603 displays a graphical user interface screen on the display 207 as the display part to make a user perform various kinds of printing set-up. The spooler 604 of the OS sequentially delivers the print jobs received from the printer driver to a client spooler 606. A client manager 605 monitors the client spooler 606. When the spooler 606 begins to spool the print job, the client manager decides the set-up of the print job to extract job information from the print job, in the case of the client spooler, to issue a print request to a print server 610 and to make a client spooler 606 spool the print job. On the other hand, in the case of a server spool, the client manager supplies the print job spooled in the client spooler 606 to the print server 610 as a print request to finish a print processing as the client. Further, when the client manager 605 receives a transmit permission notice of the print job from the print server 610, the client manager begins to transmit the print job spooled on the client spooler 606 directly to a network printer. At this time, the print job spooled in the client spooler is not deleted but held. When the client manager 605 receives a print completion notice from the print server 610, client manager can delete the spooled print job.

Detailed Description Text (33):

Reference numeral 610 denotes a machine in which a print server module corresponding to the network printer control program as the print control program for executing a procedure shown in a flowchart described below. 611 denotes a server manager which receives a print request from each client through the network 106. In the case where the print request is the print job including the print data, the print job is spooled in a server spooler 612 and the job information receiving the print request is managed in a job management table 613. On the other hand, in the case when the print request is the job information including no print data, the job management table is updated on the basis of the job information. Further, the server manager 611 monitors the processing state of the job in each network printer, updates the job management table 613 every time the output of the print job is completed, and starts the transmission of subsequent print jobs. At this time, when the print jobs to be transmitted are spooled in the server spooler 612, the print server 610 transmit them as they are. However, when the print jobs to be transmitted are spooled by the client spooler 606, the transmit permission notice of the print jobs is supplied to its client. Further, the job management 613 (job managing means) has a print queue 615 for controlling a print order on the basis of the job information received from the client and managing an order for sequentially supplying the transmit permissions of the print jobs and a group job management table 616 for managing as to whether or not the information of all the print jobs in a group job is prepared. Reference numerals 105 and 650 denote network printers.

Detailed Description Text (46):

In the client 600, when the application 601 starts a printing process, a user sets a printing step by employing a graphical user interface (see FIG. 19) for setting the printing step provided by the printer driver in step s1001. The printer driver 603 provides a graphical user interface screen for setting the print step and displays it on the display 207 through the OS. Referring to FIG. 19, 1901 denotes a menu capable of setting the types of print job. In "print" of the menu, a print job is generated for an ordinary printing process, and the print job is transmitted to the print server or the printer together with a print request. On the other hand, in "group print" in the menu, a print job is generated as a group print job (also

called a grouping job. This print job is not spooled in the print server or the client. The job information is outputted to the print server.

Detailed Description Text (51):

Further, while the "permission/inhibition of group print" is designated by a user upon instruction of a print by employing the graphical user interface for setting the print step of the printer driver, and then, the print is instructed, the display of the graphical user interface screen may be carried out by displaying a DLL registered as the port monitor of the Windows spooler 604 or a dialog in the client, every time data is supplied to the port as a contact for the Windows spooler 604, or designating the screen as a port exclusively used for a group print for each port. For instance, the group printing may be automatically carried out on the basis of information capable of specifying the print job to be grouped by the printing system according to the invention, such as a prescribed document name employed by the application or an ID allocated uniquely by the Windows spooler 604, etc.

Detailed Description Text (53):

When it is decided that the above job is the print job for a group printing in accordance with the decision in the step s1002, the client manager 605 supplies a dialog box for receiving a designation from a user shown in FIG. 17 to the OS and displays the dialog box on the display 207. The dialog box shown in FIG. 17 can designate a group name (or ID) for designating the group print, the total number of jobs in the group and the print order as shown in FIG. 8. The user designates the group name and the print order by using the keyboard 206 or a mouse, etc.

Detailed Description Text (54):

As for a method for designating the group printing, since the group designating information may be designated for each job, any method for uniquely specifying the contents of the group designating information relative to information (document name, job ID, etc.) capable of a job may be possibly employed. Further, the designated values possessed by the client such as a registry or an INI file may be employed without display of the dialog box and a manual input, or a plurality of information may be held so that the user can select it.

Detailed Description Text (63):

In the step s1009, the client manager 605 acquires the list of the grouping jobs from the server manager 611 in accordance with the above inquiry, generates data for display and displays it on the display 207 through the OS as shown in FIG. 18.

Detailed Description Text (64):

FIG. 18 shows one example of a display screen formed by the client manager on the basis of the list of the grouping jobs managed by the group job management table.

Detailed Description Text (71):

As illustrated in FIG. 16, according to the present embodiment, group names, the total number of jobs, printer names, printer status and job IDs, print orders, status and client names are included so that the number of them correspond to the number of jobs.

Detailed Description Text (86):

FIG. 12 is a flowchart showing one example of a third data processing procedure in the information processor according to the present invention and corresponds to that of the server manager 611 in the print server 610 shown in FIG. 6. This procedure is executed for a process unit like the thread of Windows in such a way that the server manager 611 monitors the status of a printer under the control connected to the network, manages spooled jobs, and successively starts the transmissions of the print jobs to proper printers. s1201 to s1208 denote respective steps.

Detailed Description Text (87):

First, in step s1201, the server manager 611 monitors the status of the printer under the control. When the server manager decides that the print job can be transmitted to the monitored printer, this process is started. Then, in step s1202, the server manager 611 searches job information spooled in the job management table 613. Then, in step s1203, the server manager decides whether or not the print job waiting for print is present among the print jobs to be transmitted to the proper printer in the job management table 613. When this state is a steady state and there is no print job waiting for print, the server manager stays in the step s1201 to continuously wait for a job to be spooled until it is decided that the job waiting for print exists in the step s1203.

Detailed Description Text (88):

On the other hand, in the step s1203, when it is decided that there is a job waiting for print, the server manager 611 decides whether or not the print job waiting for print belongs to a group print. If the print jobs are arranged in the print order of group print designation, the server manager 611 analyzes the group job management table 616 in step s1205 so that it decides whether or not all print jobs in the same group are spooled. In this case, when the server manager decides that all the print jobs in the group are spooled, the server manager 611 carries out the print processing of the grouping job in step s1206. Specifically, the server manager 611 transmits the print jobs sequentially spooled in accordance with the print order in the group to the printer. In this transmit processing, the server manager 611 recognizes the spool method of the print job in the print order, reads out the proper print job stored in the server spooler 612 in the case of the server spool, and transmits the print job to the printer through the network. Further, in the case of the client spool, the server manager 611 recognizes the client 1805 shown in FIG. 18 and supplies print transmit permission information including information for designating the job ID to the relevant client. When the transmit processing of print data to the printer 105 from the print server 610 or the client 600 is completed, the server manager 611 changes the status information of the group print information (GP-INFO) managed in the group job management table 616 and the group management table 610 shown in FIG. 6 to "end of transmission" to shift to a processing of the print job corresponding to a next print order. The jobs of the same group are continuously transmitted to the printer 105 to perform a print process by repeating the print procedure.

Detailed Description Text (97):

Then, after the start of the thread, in step s1302, the server manager 611 monitors the status of the printer under control through the network to wait for the notice of print recognition from the printer 105.

Detailed Description Text (98):

In this recognition method, for instance, in the case of the network printer under the network environment of TCP/IP, the print server may carry out a polling using a command such as get of SNMP, or may receive a notice from the printer 105 by a trap or the like.

Detailed Description Text (110):

According to the second embodiment, it is recognized that the print jobs for which the print requests are sent are printed and the printed jobs are discharged together and the notice that the print jobs are printed together is sent to the client (host computer) issuing the print request for each print job. However, any error may be possibly generated in the printer 105 during the printing process. In the case where an error is generated in the printer before the print jobs to which the print requests are issued are printed and the printed jobs are delivered together, a configuration may be used in which the destination where printing is performed is changed together to another printer on the network. Now, a third embodiment of the present invention will be described hereinafter.

Detailed Description Text (112):

First, in step s1401, when a process of print recognition is started, the server manager 611 is put to a state in which the server manager 611 acquires the status of the printer 105 or the print job on the basis of the notice from the printer 105, or is waiting for receiving a notice from the client 601.

Detailed Description Text (119):

On the other hand, when an instruction is supplied so to change the printer to a substitute printer after steps 1402 and s1403 shift to step s1411 shown in FIG. 14, the server manager 611 decides whether or not the print job of the substitute printer designated by the client is the group print job in step s1412 on the basis of the job information. When the print job is not the job of group print, the server manager 611 moves only the designated print job in step s1413. When the print job is the job of group print, the server manager updates group print information (GP-INFO) in step s1414, shifts to the steps s1409 and s1410. The server manager 611 changes the output part of all the print jobs in the group to the substitute printer and spools the job information of the print jobs in the print queue in the relevant printer.

Detailed Description Text (123):

In step s1503, when it is decided that the print confirmation is supplied to the client manager, in step s1504, the client manager 605 provides, for example, the graphical user interface screen showing the change of the status or the like such as the dialog box or the print manager print manager and displays the print confirmation or notification on the display 207 through the OS to give a notice to the user. Then, the procedure returns to the step s1502 after the confirmation.

Detailed Description Text (124):

In case of the group print, after the confirmation process to the client is finished, the job information is deleted. Therefore, for this display process, a special display for indicating that the print confirmation of the group print is completed may be done by obtaining the job information or the group print information from the server manager 611 of the print server 610.

Detailed Description Text (125):

On the other hand, in step s1503, when it is decided that the notice is not the print confirmation, the client manager 605 decides in step s1505 whether or not the notice is an error notice. When the client manager 605 decides that the notice is the error notice, the procedure advances to step s1506. The client manager 605 provides a dialog showing the error of a job to display it on the display 207 through the OS and notify the user of the error. In this display, the client manager 605 may give a notice to the user as the change of the status of the print job like the print manager of Windows without displaying a special notice message.

Detailed Description Text (126):

Then, after the notice of an error is displayed, in step s1507, the client manager 605 provides a user interface (UI) for changing the printer such as the dialog box of Windows and displays the notice on the display 207 shown in FIG. 2.

Detailed Description Text (128):

Further, when the printer is changed to a substitute by the server manager 611, a notice of change of the printer is sent from the sever manager 611. In this case, the procedure advances to the steps s1503 and s1505 from the step s1502 for waiting for an instruction. Instep s1510, the client manager 605 decides whether or not the instruction for changing the printer is sent. When the instruction for changing the printer is not supplied to the client manager, the procedure returns to the step s1502. When the client manager 605 decides that the instruction for changing the printer is sent, the procedure moves to step s1511 to notify the user of the substitute printer through the dialog box or the like on the display 207 shown in FIG. 2. Then, the procedure returns to step s1502. In this case, after the printer

changing process of the job is completed, only a notice of the changed result is sent or displayed.

Detailed Description Text (136):

In the above described embodiment, although the network printer is employed as the example, it should be noted that the present invention is not limited to the network printer, and any printer capable of transmitting data from the print server and obtaining the status information, such as a printer locally connected to the print server, may be utilized.

Detailed Description Text (137):

To the case where there is provided only the spool of the job information like a virtual print server system, and, the case where a print server function is installed in the network printer, the present invention can be applied.

CLAIMS:

2. The print controlling method according to claim 1, further comprising: an aligning step of rearranging and aligning an order of printing the first print job identified in said identifying step in a specified order specified by the print request, wherein said controlling step controls an order of outputting the aligned first print job and the second print job for any one of a plurality of printers, based on a state of alignment of the first print job aligned in said aligning step.

10. The storage medium according to claim 9, wherein the program further comprises: code for an aligning step of rearranging and aligning an order of printing the first print job identified in the identifying step in a specified order specified by the print request, wherein the controlling step controls an order of outputting the aligned first print job and the second print job for any one of a plurality of printers, based on a state of alignment of the first print job aligned in the aligning step.

24. The print controlling method according to claim 23, wherein: in said first user interface providing step, the first user interface lists and displays a plurality of grouping jobs managed by the management server and print jobs to be included in each grouping job; and in said second user interface providing step, the second user interface includes a region for specifying the order of printing in a grouping job.

27. The storage medium according to claim 26, wherein: in the first user interface providing step, the first user interface lists and displays a plurality of grouping jobs managed by the management server and print jobs to be included in each grouping job; and in the second user interface providing step, the second user interface includes a region for specifying the order of printing in a grouping job.

30. The program product according to claim 29, wherein the program further comprises: program code for an aligning step of rearranging and aligning an order of printing the first print job identified in the identifying step in a specified order specified by the print request, wherein said controlling step controls an order of outputting the aligned first print job and the second print job for any one of a plurality of printers, based on a state of alignment of the first print job in the aligning step.

41. The program product according to claim 40, wherein: in the first user interface providing step, the first user interface lists and displays a plurality of grouping jobs managed by the management server and print jobs to be included in each grouping job; and in the second user interface providing step, the second user interface includes a region for specifying the order of printing in a grouping job.

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